

ABSTRACT OF THE DISCLOSURE

The present invention is generally directed to doping methods for fully-depleted SOI structures, and a device comprising such resulting doped regions. In one illustrative embodiment, the device comprises a transistor formed above a silicon-on-insulator substrate comprised of a bulk substrate, a buried oxide layer and an active layer, the transistor being
5 comprised of a gate electrode, the bulk substrate being doped with a dopant material at a first concentration level. The device further comprises a first doped region formed in the bulk substrate, the first doped region being doped with a dopant material that is the same type as the bulk substrate dopant material, wherein the concentration level of dopant material in the
10 first doped region is greater than the first dopant concentration level in the bulk substrate, the first doped region being substantially aligned with the gate electrode. In another illustrative embodiment, the device further comprises second and third doped regions formed in the bulk substrate. In this embodiment, the first doped region is substantially aligned with the gate electrode and vertically spaced apart from the second and third doped regions. In one
15 illustrative embodiment, the method comprises forming a gate electrode above a silicon-on-insulator substrate wherein the bulk substrate is doped with a dopant material at a first concentration level, and performing an ion implant process using at least the gate electrode as a mask to implant a dopant material into the bulk substrate, the implant process being performed with a dopant material that is of the same type as the dopant material in the
20 substrate, the implant process resulting in a first doped region formed in the bulk substrate that is substantially self-aligned with the gate electrode, the first doped region having a dopant concentration level that is greater than the dopant concentration level of the bulk substrate.